

PHONEMIC AND PROSODIC INTERFERENCE AND INTELLIGIBILITY

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The investigation of phonological transfer from a natively-acquired first language into a second language learned past the age of puberty can be viewed in two ways. The traditional comparative approach treats the native speech patterns as norms and measures the extent of disparity between the two systems in terms of differing phonemic and prosodic inventories and their distributional variants. The result is a prediction of the difficulties the learner will experience in attempting to master the sounds and sound patterns of the non-native language.

The crucial problem of phonological transfer, however, is not the number and severity of distortions made by the non-native speaker, but their effects upon the listener in the communication situation — that is, the degree of interference in the transmission of information. This may or may not correspond to the actual amount of distortion, depending on such factors as the listener's own linguistic history, his familiarity with the speaker, situational cues present in the physical setting, topic of discourse, etc. For a judgment of intelligibility to be valid, therefore, we must assume the hypothetical listener to be a monolingual, conditioned only to the native pronunciation of his language, who is hearing non-native speech for the first time. We are interested in this listener's ability to correctly decode and reconstruct the spoken message in its altered form. If our listener is successful in handling the phonological interference, the message will be understood. If he is unsuccessful, the message will not be understood, or may be misunderstood. The amount of mental effort required by the listener to reach a decision on the content of the message, if he can at all, will determine his judgment of the speaker's intelligibility. What I am suggesting in this paper is that we must recognize two distinct kinds of phonological interference which affect the listener in opposite ways with regard to intelligibility, if he is able to cope with one kind — phonemic — more easily than the other — prosodic.

Let us now examine what the listener actually does about phonemic interference when confronted with a mis-pronounced utterance that he is expected to understand. First of all, because he is unprepared for distortions, he must immediately raise his attention level in order to consciously register upon his short-term memory all the

sounds he hears in correct temporal sequence; he cannot fall back on the redundancies built into natively-pronounced speech, and he must be vigilant not to miss any sounds which might be an important clue in decoding the message. Next, he searches through his stored repertoire of linguistic units looking for phonetic resemblances, and brings these possibilities to his conscious mind for closer comparison with the freshly received auditory impressions. Finally, by eliminating unsuitable alternatives he arrives, in favorable cases, at a positive identification of the speaker's words: a one-to-one mapping of the received signals onto discrete meaning-bearing linguistic units. During this process he continually sets up potential code correspondences between the phonemes of his own speech and their aberrant realizations in the speech stream of the non-native speaker. These potential correspondences are rejected or generalized as new linguistic units are positively identified, and as the listener becomes more and more adept at recognizing words through the haze of distortion, he can relax his earlier vigilance. Obviously, linguistic context plays a tremendously helpful role. It enables the listener to choose the one alternative out of several which makes sense grammatically and semantically. Where ambiguity remains, larger and larger contexts can be utilized. What is important here is that each positive identification of a meaning-bearing linguistic unit, and each confirmation of a phonemic code correspondence, makes the succeeding one easier to accomplish. Phonemic interference, therefore, is self-limiting, and operates for the listener in the direction of more intelligibility. See the example below:

[sɪŋ]:	{	—seen?	
		—sing?	
		—sink?	I _____ so.
		—thing?	
		—think?	

If we now examine what the listener is able to do with prosodic interference, we see that the situation is quite different. Here, too, we have a heightened attention level, and the conscious registry of prosodic patterns simultaneously with the segmental sounds. Here too, he searches his long-term memory for similarities. But at this point, the strategy used for phonemic interference must be abandoned. Whereas phonemic interference involved the identification of meaning-bearing linguistic units, in prosodic interference, the meaning of the pattern itself must be identified. But what is the meaning of a prosodic pattern? In actual cases, it is always a product of the meanings of the linguistic units contained in the utterance it accompanies, PLUS the expectations of the listener in that particular social context. An appropriate prosodic pattern enhances and confirms the lexical message; it is like good background music and does not command special attention. An inappropriate prosodic pattern, however, denies or contradicts the lexical message, signalling the presence of additional information which is superimposed on the lexical message, and which must be identified and included in the total meaning of the utterance. Compare, e.g.,

Fire the torpedoes!
Pass the salt.

If the usual patterns are switched, both utterances become emotionally charged. Each inappropriate prosodic pattern stays in conscious memory until its meaning is determined. What happens in an interference situation is that the prosodic pattern used by the non-native speaker is hardly ever the appropriate one for that utterance in that situation, except by accident. But the listener cannot use linguistic context to help him, because preceding utterances also have inappropriate and unresolved prosodic patterns and the listener is unable to relate the total meaning of one utterance to the total meaning of the next. The effect of prosodic interference is thus cumulative. The listener cannot TUNE IN to the speaker, and cannot relax his vigilance. He reacts negatively to the unintended signals. He becomes frustrated by his own failure, and annoyed with the speaker for forcing him to expend so much mental effort. The speaker's successive utterances seem increasingly incoherent, and the communication situation deteriorates to the point where the listener, psychologically exhausted, sheds his burden with a judgment of unintelligibility.

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DISCUSSION

LÉON, P. (Toronto)

What do you mean by the 'meaning' of a prosodic pattern?

NASH

Whatever information the pattern contributes to the total meaning of the particular utterance: it may be grammatical, expressive, or just a signal that it's an acceptable utterance in that particular language. I don't believe in meaningless prosodic patterns.

KOUTSTAAL (Bowling Green, Ohio)

You say that the improper prosody acts accumulatively, in a negative manner. But then, we do adapt to speakers' differences such as classifying their speech as a German accent in English and the like. Thus we learn to ignore or compensate for improper prosody.

NASH

The listener may learn in time to consciously ignore the inappropriate prosodic patterns, but at the cost of getting only a fraction of the meaning, and not being too sure about that. More probably he will decide that it's not worth the effort. As for recognizing accents, it's quite possible to have one and still be completely intelligible, if the only interference is phonemic.

KOCOUREK (Halifax, N.S.)

Phonemic and prosodic interferences from the mother tongue do not only, as has so interestingly been shown, result in the fact that a native listener finds various degrees of difficulty in understanding utterances produced by a non-native speaker. They may also have the effect of lowering the extent to which a non-native listener understands utterances by native speakers. It would be interesting to take up this question in a study complementary to the research just described.

NASH

You are quite right. This effect is clearly observable in foreign language classes, where students frequently understand each other much better than they understand the teacher, even where the teacher slows down and speaks in an unnatural way. As a general principle we could say that, all other things being equal — that is, the extralinguistic factors such as awareness of subject matter and so on — the more closely matched the prosodic patterns used by a speaker are to the prosodic patterns the listener is conditioned by his linguistic training to expect, the higher the degree of intelligibility.

I appreciate your excellent suggestion for a complementary study on the intelligibility of utterances made by native speakers to non-native listeners, and shall certainly follow it up.

JAMES (Toronto)

I would like to support what Prof. Nash has said by quoting some of the results of a recent experiment on teaching French intonation with the Léon-Martin pitch meter. Judges — trained phoneticians and native French speakers — were asked to judge imitations of model sentences, recorded by English-speaking students during training sessions. Although these listeners were asked to judge the utterances for correctness of prosodic features only, they were sometimes influenced by poor articulation. However, in the GREAT MAJORITY of cases, correct prosody was rewarded despite the fact that it was coupled with poor articulation. These conclusions are based on instrumental study of intonation curves generated, my own assessment of the articulations involved and the judgments made by our listeners.

NASH

Your experimental observations are interesting and quite important. The fact that a majority of your subjects were able to judge correctness of intonation patterns independently of good or bad sound articulations supports my position that, in the communication situation, correct prosody is like background music in a motion picture: if it is appropriate, we are hardly aware of it; the conscious mind must deal with it, however, if it does not 'fit'. Imagine the William Tell Overture played as background to a love scene, or a tender violin solo accompanying a lively chase!